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EXAMINER	
NGUYEN, KHIEM D	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 08/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/033,233	AKRAM, SALMAN	
	Examiner	Art Unit	
	Khiem D Nguyen	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 May 2004* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *16-20* is/are allowed.

6)☒ Claim(s) *1-6 and 8-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6, and 8-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Mu (U.S. Patent 4,887,148).

In re claims 1 and 12, **Mu** discloses a method of making an IC chip package having an IC chip with an active surface, the active surface having extending therefrom an electrical connector in electrical communication with IC chip, the IC chip being mounted upon a substrate, the method comprising (col. 3, line 4 to col. 4, line 15 and **FIGS. 1-5**): providing a container **(FIG. 1: 22, 52)** disposed upon the substrate **(FIG. 1: 14)**, the container in contact with the active surface of the IC chip **(FIG. 1: 18)**; and injecting a grease **(FIG. 1: 20)** in contact with the active surface of the IC chip such that the grease is enclosed by the container and the substrate (col. 5, lines 10-33); and is in contact with the active surface and the electrical connector **(FIG. 1: 44)**.

In re claim 2, **Mu** discloses securing the container to the substrate with a dam structure **(FIG. 1: 54)** that contacts the grease (col. 5, lines 17-33).

In re claims 3 and 13, **Mu** discloses operating the IC chip to generate heat therefrom and conducting the heat from the IC chip and the electrical connector to the grease, to the container, and to the ambient (col. 2, lines 32-48).

In re claims 4 and 11, **Mu** discloses wherein the container comprises a metal that has a thermal conductivity greater than the thermal conductivity of the grease (col. 5, lines 17-33).

In re claims 6 and 9, Mu discloses wherein the IC chip package comprises IC chip elements **(FIG. 1: 18)**, wherein the container **(FIG. 1: 22, 52)** disposed upon the substrate **(FIG. 1: 14)** encloses a volume external to the IC chip elements, and wherein the injecting a grease **(FIG. 1: 20)** comprises the filling with the grease of the volume enclosed by the container.

In re claims 8 and 10, **Mu** discloses wherein a flip chip is disposed over the active surface of the IC chip, wherein the container is a dam structure **(FIG. 1: 54)**, and wherein the dam structure is in contact with each of the IC chip, the flip chip, and the grease **(FIG. 1: 20)**.

In re claim 14, **Mu** discloses wherein the substrate is a flex substrate (col. 1, lines 47-50).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mu (U.S. Patent 4,887,148) as applied to claims 1-4, 6, 8-14, 16-18 and 20 above, and further in view of Hunadi et al. (pp. 28-32, Advanced Packaging, April 1999).

In re claims 5 and 15, **Mu** discloses most aspects of the instant invention but does not explicitly disclose wherein the grease has thermal conductivity in a range from about 2 Watts/m·K to about 5 Watts/m·K, a dielectric constant in a range from less than about 6 to about 9, and a melting point in a range from about 190° C to about 220 °C.

Hunadi discloses in (pages 28-30, tables 1-3), a thermal grease A having a thermal conductivity of 3.3 Watts/ m · K, a dielectric constant of 7.62 and a melting point at 200°C. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Mu and Hunadi to enable the grease of Mu to be formed and furthermore to achieve superior performance over the conventional thermal greases (page 32).

Allowable Subject Matter

Claims 16-20 are allowed.

Reasons For Allowance

The following is a statement of reasons for the indication of allowable subject matter: The prior art taken alone or in combination neither discloses nor makes obvious the instant process of claims as a whole. Specifically, the prior art of record, Mu (U.S. Patent 4,887,148) discloses a method of making an IC chip package having an IC chip with an active surface, the active surface having extending therefrom an electrical connector in electrical communication with IC chip, the IC chip being mounted upon a substrate, the method comprising (col. 3, line 4 to col. 4, line 15 and FIGS. 1-5): providing a container (FIG. 1: 22, 52) disposed upon the substrate, the container in contact with the active surface of the IC chip (FIG. 1: 18); and injecting a grease (FIG. 1:

20) in contact with the active surface of the IC chip such that the grease is enclosed by the container and the substrate (col. 5, lines 10-33); and is in contact with the active surface and the electrical connector (FIG. 1: 44) but fails to teach or suggest the Applicant's steps of providing a second IC chip having an active surface and being disposed over the first side of the BOC substrate; providing a container disposed upon the BOC substrate, the container in contact with the active surface of the first IC chip; and inject a grease between the BOC substrate and the containers as recited in the independent claim 16, lines 6-10.

Response to Applicant's Arguments and Amendment

Applicant's arguments filed May 17th, 2004 have been fully considered but they are not persuasive.

Applicants contend that Mu discloses a chip package body member and a cover member that surround a die, but are not in contact with the active surface of die as shown in Figure 1.

In response to Applicant's contention that Mu, U.S. Patent 4,887,148 does not disclose providing a container disposed upon the substrate, the container in contact with the active surface of the IC chip, Examiner respectfully disagrees. Applicant is directed to (col. 3, lines 4-46 and col. 5, lines 10-33 and FIG. 1) where Mu discloses providing a container (FIG. 1: 22) disposed upon the substrate (FIG. 1: 14), the container in contact with the active surface of the IC chip (FIG. 1: 18); and injecting a grease (FIG. 1: 20) in contact with the active surface of the IC chip such that the grease is enclosed by the container and the substrate; and is in contact with the active surface and the electrical

connector (FIG. 1: 44). Thus, Mu does disclose a container in contact with the active surface of the IC chip.

For this reason, examiner holds the rejection proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (571) 272-1865. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.
July 28, 2004

W. DAVID COLEMAN
PRIMARY EXAMINER